

Connecting Lock for Exhibition FramesTechnical Field

This invention relates to a kind of connecting lock for exhibition stand. It is used for the connection between exhibition stands.

Background Art

The exhibition stands used in expo are steady frame ones consisted of beams and columns, which are connected and fixed through the connecting locks. Chinese Patents ZL99113438 and ZL99113439 are the connecting locks put forward by the applicant, Figure 1 shows the composite structure of connecting lock, Figure 2 and 3 show the shape and structure of lock plate, and Figure 4 shows the shape and structure of lock shell. It can be seen from these figures that the connecting lock is consisted of Lock plate 2, Eccentric lock cam 3 and Lock shell 1. Lock plate 2 is inserted into Lock shell 1, Eccentric lock cam 3 will be inserted into Hole 15 with an Arc 151 on Lock shell 1 (see the Face Side in Figure 4) after Lock plate 2 has been inserted into Lock shell 1, then through Hole 5 on Lock plate 2, inserted into Hole 53 on Lock shell 1 (see the Bottom Side in Figure 4), a fixed structure will be formed after rotation. Figure 2 shows the shape and structure of Lock plate 2 of the connecting lock. It can be found from it that there are two elongated slots with different widths on Lock plate, the slot is divided into three sections – Section 41, 42 and 43 with different widths, forming three Plate tongues of different widths at the forepart of Lock plate. The foreparts of plate tongue are bent into Hooks 21, 22 and 23, with the reverse bending direction between adjacent hooks. The backend of Lock plate 2 is bent into a U-shaped half-loop 26, the End surface 261 of which is a plane. Rotate Eccentric lock cam 3, the Big cam 361 on it will push against such plane, force Lock plate 2 to move backwards, and force Bevels 231,

232 and 233 on three plate tongues to move backwards along Inclined bearing surfaces 131, 121 and 111. In this way, three hooks on the forepart of Lock plate will expand along reverse directions, so the connecting lock fixed in the beam will be locked inside the column section bar, then form into steady and fixed frame exhibition stands. The movement of Lock plate will be stopped by Small stop cam 362 on the forepart of Eccentric lock cam by pressing against the side wall of Hole trough 5 on Lock plate 2. The connecting lock of such structure has very good usability and has been applied widely. However, since Eccentric lock cam 3 has two cams – Cam 361 and 362, the difficulty of fabrication is increased; while it is necessary to change the stop structure if eliminating Small stop cam 362. It is a technical difficulty.

#### **Disclosure of invention**

The purpose of this invention is to design a kind of new connecting lock aiming at the above mentioned technical difficulty, improving the existing one. The places of improvement include the changes in Lock plate and shape and structure of Eccentric lock cam, which is convenient to simplify the structure, reduce the cost and facilitate users to use.

The technical proposal of this invention is: A kind of connecting lock used for exhibition stand, which is consisted of Lock shell 1, Lock plate 2 and Eccentric lock cam 3, Lock plate 2 is inserted into Lock shell 1, Eccentric lock cam 3 will be inserted into Hole 15 with an Arc 151 on Lock shell 1 after Lock plate 2 has been inserted into Lock shell 1, then inserted into Hole 53 on Lock shell 1 through Hole 55 on Lock plate 2, there are two elongated slots with different widths on the Lock plate, which are divided into three sections – Section 41, 42 and 43 with different widths, forming three Plate tongues of different widths in the forepart of Lock plate. The foreparts of Plate tongue are bent into Hooks 21, 22 and 23, the bending

direction of adjacent hooks is different from each other. The backend of Lock plate 2 is bent into a U-shaped half-loop 26, the End surface 261 of which is a plane. There are Bevels 231, 211 and 221 on three Plate tongues, and Inclined bearing surface supporting blocks 131, 121 and 111 in front of Lock shell 1. The features include: There are a Stop tooth 27 on Lock plate 2, a fully arc shaped Eccentric cam 332 on Eccentric lock cam 3, both Eccentric cam 332 and Stop tooth 27 constitute of the stop structure.

There are a Big shaft 333 and a Small shaft 331 on Eccentric lock cam 3, there is a Quincunx hole 334, which is easy to rotate Eccentric lock cam 3 with special tool, on the surface of Big shaft 333.

At the time of use, rotate Eccentric lock cam 3 counterclockwise with special tool until reaching Stop tooth 27, disengaging it to rotate anymore; meanwhile, Cam 332 on Eccentric lock cam 3 will push against the Plane 261 on Lock plate 2 and force it to move backwards, Bevels 231, 211 and 221 on three Plate tongues will move backwards along Inclined bearing surfaces 131, 121 and 111 in the forepart of Lock shell 1. In this way, three hooks on the forepart of Lock plate will expand along reverse directions, so the connecting lock fixed in the beam will be locked inside the column section bar, then form into steady and fixed frame exhibition stands.

By adopting the above mentioned improvements, the structure of Plate tongue and Eccentric lock cam is simplified, the stop structure is change; as a result, the structure and process of connecting lock is further simplified, the cost is saved, and the adaptability is increased.

#### **Brief Description of drawings**

Figure 1 shows the composite structure of existing connecting lock.

Figure 2 shows the lock plate complementary structure of existing Lock plate.

Figure 3 is the top view of Figure 2.

Figure 4 shows a Lock shell complementary example of this invention.

Figure 5 is the top view of Figure 4.

Figure 6 is an complementary example of this invention.

Figure 7 shows a Lock plate structure complementary example of this invention.

Figure 8 is the top view of Figure 7.

Figure 9 is an Eccentric lock cam complementary example.

Figure 10 is the left view of Figure 9.

Figure 11 is the right view of Figure 9.

Figure 12 is the front view of this invention complementary example.

Figure 13 is the sectional vies of this invention complementary example.

Attached figures and corresponding explanations: Figure 1, Figure 2 and Figure 3 show the existing technical connecting lock, where 2 is the Lock plate, 3 is the Eccentric lock cam, 1 is the Lock shell. 15 is the Hole with an Arc 151 on Lock shell, 5 is the Hole on Lock plate 2, 53 is the Hole on bottom side of Lock shell 1, and 41, 42 and 43 are three slots with different widths on Lock plate; 21, 22 and 23 are the Hooks of three Plate tongues with different widths on the forepart of Lock plate; 361 is the Big cam on Eccentric lock cam 3; 362 is the Stop cam on the forepart of Eccentric lock cam 3; 24 is the Elastic brace rod on Lock plate; 241 and 141 are the contact points of Elastic brace rod 24 on the internal surface of Lock shell; 221 and 121 are the parts of braced structure between the hook bevel on the forepart of Lock plate and Lock shell bearing plane.

In Figure 4- 11: 1 is the Lock shell; 2 is the Lock plate; 3 is the Eccentric lock cam; Lock plate 2 is inserted into Lock shell 1; Eccentric lock cam 3 will be inserted into Hole 15 on Lock shell 1 after Lock 2 has been inserted into Lock shell 1, then inserted into Hole 53 on Lock shell 1 through Hole 55 on Lock plate

2; 41, 42 and 43 are three sections of elongated slots with different widths; 21, 22 and 23 are Hooks bent from the forepart of Plate tongues on Lock plate, where Hook 21 and 23 have the same bending direction, while Hook 22 has the reverse direction; 211, 221 and 231 are the parts of transition bevel between Hook and Plate tongue; 551 is the Flange of Hole 55 on Lock plate 2; 16 is the Rectangular hole on the side surfaces of Lock shell; 17 is the Flange strip of internal surface on the bottom of Lock shell 1; 111, 121 and 131 are the Inclined bearing surface supporting blocks of Hook transition bevels 211, 221 and 231; 15 is the Hole with an Arc 151 on the upper surface of Lock shell, where Eccentric lock cam 3 is inserted; 53 is a Small hole on the lower side surface of Lock shell 1 that matches the Small shaft 331 of Eccentric lock cam, 146 is the Rectangular hole on the internal surface of lower side of Lock shell 1; 24 is the Elastic brace rod on Lock plate 2, 241 is the contact point between Elastic brace rod and 141 on internal surface of lower side of Lock shell 1, 27 is the Stop tooth on Lock plate 2 composing the stop structure with Eccentric cam 332, 28 is the Barrier tooth on Lock plate 2, 331 is the Small shaft of Eccentric lock cam 3, which is inserted into the Small hole 53 on lower side surface of Lock shell 1 through Hole 55 on Lock plate; 332 is a fully Arc shaped eccentric cam located on Hole 55 of Lock plate 332, composing the stop structure together with Stop tooth 27; 333 is the Big shaft at the head of Eccentric lock cam, matching with the Side arc 151 on Lock shell, there is an Quincunx lock hole 334, which is easy for lock and open, on the surface of Big shaft 333 at the head of Eccentric lock cam.

#### **Detail description of the invention**

The technical proposal of this invention is: A kind of connecting lock for exhibition stand, consisted of Lock shell 1, Lock plate 2 and Eccentric lock cam 3, Lock plate 2 is inserted into Lock shell 1, Eccentric lock cam 3 will be first

inserted into Hole 15 with an Arc 151 on Lock shell 1 after Lock plate 2 has been inserted into Lock shell 1, then inserted into Hole 53 of Lock shell 1 through Hole 55 of Lock plate 2, there are two elongated slots with different widths on Lock plate, there are three sections of different widths 41, 42 and 43 on the elongated slot, forming three Plate tongues at the forefront of Lock plate. The forefront of Plate tongues will be bent into Hooks 21, 22 and 23, with the reverse direction between adjacent hooks. There are Bevels 231, 211 and 221 on three Plate tongues, and there are Inclined surface supporting blocks 131, 121 and 111 on the forefront of Lock shell 1. The features include: There is a Stop tooth 27 on Lock plate 2, and the stop structure is consisted of Eccentric cam 332 on Eccentric lock cam 3 and Stop tooth 27. Rotate counterclockwise Eccentric lock 3 until reaching Stop tooth 27 and disengaging to rotate anymore (Figure 4, 5, 6, 7, 8, 9, 10 and 11). Whereas Lock plate needs to rely on the acting force to it generated by Eccentric lock cam to realize back and forth movement, the setting of working point will be better for Eccentric lock cam to apply the acting force on Lock plate. In this implementary example, the working point is to bend the backend of Lock plate 2 into a U-shaped half-loop 26, and the end surface of which is a plane; the following technical measures can also be used in this implementary example to realize the back and forth movement, such measure is: Set a Wedged bulge 262 behind Eccentric lock cam 3 on Lock plate 2, which can constitute into a "V" shape through connecting with Lock plate 2, this technical measure enables to complete the fabrication of Wedged bulge during the manufacturing process of Lock plate together with the punch of Lock plate. Therefore, compared with the way of bending edge fold to get the working point of acting force, the manufacturing process of Wedged bulge may be realized along with the punch process of Lock plate manufacturing, so it has the advantages of lower manufacturing cost and simple process; the "V" shaped connection between

Wedged bulge and Lock plate applied in this technical measure will increase the connecting strength between them, enabling Wedged bulge to have a better bearing capability; because this technical measure can make the contact surface between Eccentric lock cam and Lock plate to be vertical with the direction of acting force that pushes Lock plate, the reliability of this invention is enhanced.

There is a Barrier tooth 28 on Lock plate 2. It plays the role of restricting Eccentric cam 332 to rotate clockwise. Hole 55 on Lock plate 2 has the Flange 551 (Figure 7 and 8).

There is a Rectangular hole 146 on the upper surface of Lock shell 1, there is a Rectangular hole 16 on the upper side of Lock shell 1, there is the Flange strip 17 on the internal surface of bottom side of Lock shell 1 (Figure 4 and 5).

There is a big shaft 333 and a Small shaft 331 on Eccentric lock cam. There is a Quincunx hole 334, which is convenient for special tool to rotate Eccentric lock cam 3, on Big shaft 333 (Figure 9, 10 and 11).

At the time of application, it disengages to rotate anymore when having rotated Eccentric lock cam 3 counterclockwise to the Stop tooth 27 with special tool, meanwhile, Eccentric cam 332 will push against the Backend of loop 261 at the backend of Lock plate 2, to move Lock plate 2 backwards, three Hooks 21, 22 and 23 will expand respectively along the Inclined bearing surfaces 131, 121 and 111, then the connecting lock will be locked inside the column.